# (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

## (19) World Intellectual Property Organization International Bureau





(43) International Publication Date 24 February 2005 (24.02.2005)

**PCT** 

# (10) International Publication Number WO 2005/017299 A 2

(51) International Patent Classification7:

**E21B** 

(21) International Application Number:

PCT/NO2004/000203

(22) International Filing Date: 2 July 200

2 July 2004 (02.07.2004)

(25) Filing Language:

Norwegian

(26) Publication Language:

English

(30) Priority Data:

20033044

3 July 2003 (03.07.2003) NO

(71) Applicant (for all designated States except US): OIL FLOW TECHNOLOGY AS [NO/NO]; Hovedgaten 13, P.O. Box 131, N-4902 Tvedestrand (NO).

(72) Inventor; and

- (75) Inventor/Applicant (for US only): TOR, Arne, Hauge [NO/NO]; P.O. Box 131, N-4902 Tvedestrand (NO).
- (74) Agent: HÅMSØ PATENTBYRÅ ANS; P.O. Box 171, N-4302 Sandnes (NO).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

### Declaration under Rule 4.17:

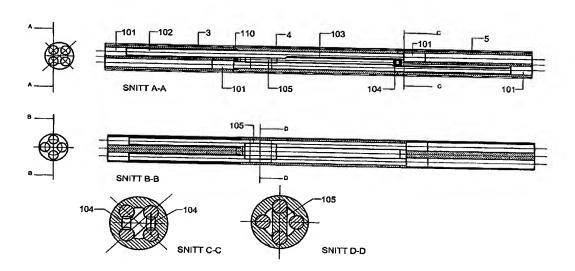
of inventorship (Rule 4.17(iv)) for US only

### Published:

 without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PUMP FOR TAIL PRODUCTION OF OIL



(57) Abstract: A piston pump for submerging in an oil well, consisting of four pistons that, by means of a fixed interlock (105) between two opposing pistons and a cog wheel interlock (104) between these and the two other pistons, get two oncoming piston pairs in which the mass forces are balanced. On the suction side, the pump has a valve set with a suction- and pressure valve for each of the cylinders in the bottom section; and, on the drive side, a bistable 3-5 port valve that alternately reciprocates the hydraulic oil flow from the drive unit to the one or the other cylinder pair.

# (19) World Intellectual Property Organization International Bureau





(43) International Publication Date 24 February 2005 (24.02.2005)

## **PCT**

# (10) International Publication Number WO 2005/017299 A3

(51) International Patent Classification<sup>7</sup>: // 9/111, E21B 43/00

F04B 47/08

(21) International Application Number:

PCT/NO2004/000203

(22) International Filing Date:

2 July 2004 (02.07.2004)

(25) Filing Language:

Norwegian

(26) Publication Language:

English

(30) Priority Data: 20033044

3 July 2003 (03.07.2003) NO

- (71) Applicant (for all designated States except US): OIL FLOW TECHNOLOGY AS [NO/NO]; Hovedgaten 13, P.O. Box 131, N-4902 Tvedestrand (NO).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): TOR, Arne, Hauge [NO/NO]; P.O. Box 131, N-4902 Tvedestrand (NO).
- (74) Agent: HÅMSØ PATENTBYRÅ ANS; P.O. Box 171, N-4302 Sandnes (NO).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

### Declaration under Rule 4.17:

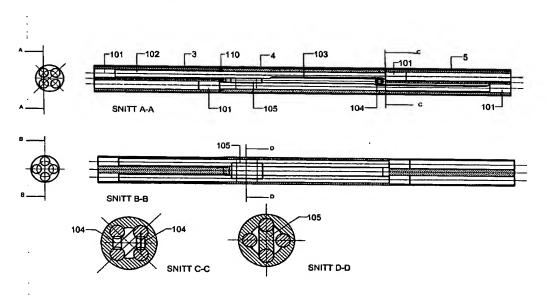
- of inventorship (Rule 4.17(iv)) for US only

#### **Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: PUMP FOR TAIL PRODUCTION OF OIL



(57) Abstract: A piston pump for submerging in an oil well, consisting of four pistons that, by means of a fixed interlock (105) between two opposing pistons and a cog wheel interlock (104) between these and the two other pistons, get two oncoming piston pairs in which the mass forces are balanced. On the suction side, the pump has a valve set with a suction- and pressure valve for each of the cylinders in the bottom section; and, on the drive side, a bistable 3-5 port valve that alternately reciprocates the hydraulic oil flow from the drive unit to the one or the other cylinder pair.



(88) Date of publication of the International search report: 6 May 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.